DISPENSER FOR CUP-SHAPED ARTICLES WITH IMPROVED CLAMP-RING SECUREMENT FEATURE

Cross-Reference to Related Application

This application claims priority from and benefit of the filing date of U.S. provisional patent application Ser. No. 60/455,821 filed March 19, 2003.

Background

The present invention is directed toward the art of dispensers for cups and other cup-shaped articles (e.g., french fry containers, soufflé cups, ice-cream cones, etc.) and, more particularly, to a new and unobvious diaphragm-type dispenser assembly and method of manufacturing same. The term "cup" as used herein is intended to encompass these and any other cup-shaped article suitable for being dispensed one-at-a-time from an interfitted stack. Dispensers of the type under consideration herein are commonly employed in restaurants and convenience stores to maintain a supply of paper, plastic, foam, and/or other disposable cups and/or cup-shaped articles near beverage or soft-serve frozen food dispensing equipment for use as required.

FIGURES 1 and 2 illustrate one example of a known diaphragm-type dispenser assembly **A** for dispensing cup-shaped articles. As illustrated in FIGURE 1, the dispenser **A** is mounted in a cabinet or other mounting structure **B** and is adapted to maintain a supply of cups **C** in a readily available condition. The mounting structure **B** defines an opening **D** into which the cup dispenser is **A** is inserted and, as is described in full detail below, the dispenser **A** is fixedly secured to the mounting structure **B** in an operative position.

More particularly, the dispenser assembly **A** comprises an elongated cup storage tube or body **10** including an inner surface **12** that defines a hollow cup

storage region **14** adapted to receive a telescopically interfitted stack **S** of cup-shaped articles **C** to be dispensed one-at-a-time. The body **10** is illustrated in the preferred, substantially cylindrical conformation, but those of ordinary skill in the art will recognize that the body **10** can be defined in any of a wide variety of other configurations so that it defines an elongated cup storage region **14** adapted to receive and confine a telescopically interfitted stack **S** of cups **C**.

The body **10** is elongated along a longitudinal axis **L** (FIGURE 2) and comprises an open first end **20** and a closed second end **22**. The second end **22** is typically closed by an integral transverse end wall **24**. The body **10** can be defined from metal or plastic or any other suitable material as desired.

In the illustrated embodiment, the body **10** includes a plurality of lugs or bosses **40a-40d** defined therein near the open first end **20** (closer to the open end **20** than the closed end **22**). If the body is plastic, the bosses **40a-40d** are defined during the molding operation and project outwardly from the outer surface of the body. As illustrated in FIGURE 1, the bosses **40a-40d** each define a sloping face **42** that diverges away from the body when considered in a direction from the first end **20** toward the second end **22** of the body. The illustrated body includes four bosses **40a-40d** defined symmetrically about the body, but those of ordinary skill in the art will recognize that any number of bosses can be defined, and that these can be arranged in any desired relationship relative to each other.

The cup dispenser assembly **A** further comprises an annular mounting collar **50** defined by a cylindrical or base portion **52** and a flange **54** that projects radially outward from the cylindrical portion **52**. The cylindrical portion **52** includes or defines a plurality of recesses or other apertures **56a-56d** that open inwardly toward the center of the collar **50**. These recesses **56a-56d** are dimensioned and arranged and otherwise adapted for respective receipt of and engagement with the bosses **40a-40d** when the collar **50** is coaxially fitted to upper end **20** of the body **10** as illustrated in FIGURE 1.

The collar flange **54** defines a plurality of mounting apertures, preferably in the form of keyhole slots **60**. When the cup dispenser **A** is to be installed into a mounting structure **B**, the closed second end **22** of the body **10** is placed into an opening **D** defined in the mounting structure, and body **10** is inserted into the mounting structure through the opening **D** until the collar flange **54** abuts a surface of the mounting structure as illustrated in FIGURE 1. The flange **54** is then fixedly secured to the mounting structure **B**, preferably by use of the fasteners **62** (see FIG. 2) that pass through the keyhole slots **60**.

In the illustrated embodiment, an outermost edge **70** of the body **10** projects outwardly above the flange **54** of collar **50**. This outermost body edge **70** provides a convenient mounting location for a flexible resilient diaphragm member **80** that defines a central opening **82**. As illustrated in FIGURE 1, the diaphragm member **80** is preferably dished and sized appropriately so that it frictionally engages the outermost edge **70** of the cup storage body **10** so as to be positioned adjacent and restrict the open end **20** of the body **10** to prevent uncontrolled release of cup-shaped articles **C** from stack **S**. The edge **70** preferably includes or defines a radially enlarged lip **72** (see also FIG. 2) that engages the diaphragm member **80** to strengthen the frictional engagement between the member **80** and the body **10**. In this operative position, the diaphragm **80** is said to be adjacent the open end **20** of the body **10** and restricts the open end to prevent uncontrolled release of the stack **S** of cup-shaped articles.

With particular reference now to FIGURE 2, the diaphragms **80',80"** are similar in all respects to the diaphragm **80**, but include central openings **82',82"** that are defined to have a different size compared to the opening **82** of the diaphragm **80** as required to accommodate differently sized cups **C**. Either diaphragm **80',80"** can be substituted for the diaphragm **80** without departing from the overall scope and intent of the present invention. Suitable diaphragm members, and operation of same to retain cups **C** releasably in the body **10**, are described, e.g., in U.S. Patent

Nos. 5,199,601 and 5,201,869, both of which patents are hereby expressly incorporated by reference herein. Furthermore, suitable diaphragm members **80,80',80"** are available commercially from Tomlinson Industries, Modular Dispensing Systems Division, Cleveland, Ohio 44125.

Once the diaphragm member **80** is fitted to the outermost edge **70** of the body **10**, a clamp-member or clamp-ring **84** is fitted to the outermost edge **70** of the body **10** as shown in FIGURE 1. The clamp-ring **84** defines a central opening **86** that is adapted for tight, frictional receipt of the outermost body edge **70** therein. Thus, after the diaphragm member **80** is fitted to the body edge **70**, the clamp-ring **84** is also fitted to the body edge **70** and secures the diaphragm **80** in its operative position with a tight friction fit, i.e., a peripheral portion of the diaphragm **80** is pinched between the body edge **70** and the clamp-ring **84** as is readily apparent in FIGURE 1. The clamp-ring **84** is preferably also defined as a one-piece molded plastic construction. The clamp-ring **84** is preferably annular in shape and circumferentially coextensive with the diaphragm to contact the diaphragm continuously or at intervals about the entire periphery of the diaphragm. An example of a dispenser including a clamp-ring **84** is disclosed in U.S. Patent No. 5,222,628, the disclosure of which is hereby expressly incorporated by reference.

The cup storage body **10** can be secured to a mounting structure **B** in an arrangement where the open first end **20** of the body **10** is placed at a lower elevation than the closed second end **22**. In this arrangement, cups **C** from the stack **S** are fed through the diaphragm opening **82** by gravity. The cup dispenser assembly **A** optionally comprises means for biasing the stack **S** of cups **C** toward the diaphragm **80** so that the closed end (bottom) of the outermost cup **C** projects outwardly through the diaphragm opening **80**, regardless of the elevation at which the open body end **20** is arranged relative to the closed body end **22**. In the illustrated embodiment, a coil spring **90** is disposed in the hollow cup storage region **14** coaxial with the axis **L**. A follower or cup pushing member **96** is closely and

slidably positioned within the hollow cup storage region **14** of the body **10**. A first end **92** of the coil spring **90** is seated against the cup pushing member **96**, and a second end **94** of the spring **90** is seated against the transverse end wall **24** of the body **10**.

The dispenser assembly **A** operates in a conventional manner as is well understood by those of ordinary skill in the art and as described in the aforementioned U.S. Patents. A telescopically interfitted stack **S** of cups **C** is inserted into the cup storage space **14** through the central opening **82** of the diaphragm **80** with the open mouth of the innermost cup engaging the pushing surface **98** of the cup pushing member **96**. The cup stack **S** is pushed into the cup storage space **14** with sufficient force to overcome the biasing force of the spring **90** so that the cup pushing member **96** moves inwardly toward the closed second end **22** of the body **10**. After the cup stack **S** is loaded into the cup receiving region **14**, the cup pushing member **96**, in response to the biasing force of the spring **90**, urges the cup stack **S** outwardly toward the open first end **20** of the body **10** so that the closed end or bottom of the outermost cup **C** in the stack **S** projects out of the diaphragm opening **82**. To dispense a single cup **C**, a user manually pulls the outermost exposed cup **C** so that the diaphragm **80** distends (as shown in broken lines in FIGURE 1) and so that the outermost cup **C** is able to pass through the diaphragm opening **82**. However, the diaphragm **80** engages the next outermost cup **C** in the stack **S** and prevents its unintended exit from the cup storage space **14** together with the outermost cup **C** pulled by a user.

These diaphragm-type cup dispensers have enjoyed widespread commercial success, and are available from Tomlinson Industries, Modular Dispensing Systems Division, Cleveland, Ohio 44125. As noted, however, the diaphragm **80** has heretofore been held in its operative position by way of a clamp-ring **84** that is friction-fit to the body **10**, with the periphery of the diaphragm pinched between the body **10** and the clamp-ring. Under especially rough handling or other extreme

adverse conditions, these clamp-rings have been known to become separated from the storage body. This is obviously an undesired occurrence, and the present development is directed to a dispenser for cup-shaped articles that includes an improved clamp-ring securement feature.

Summary

In accordance with a first aspect of the present development, a dispenser for cup-shaped articles comprises a body defining a storage region adapted for receiving for an associated stack of cup-shaped articles. A mounting collar is connected to the body. The mounting collar includes a flange projecting outwardly therefrom. A resilient diaphragm is located adjacent an open end of the storage region of the body. The diaphragm restricts the open end for controlled dispensing of associated cup-shaped articles from within said storage region. A clamp member secures the diaphragm adjacent the open end of the storage region of the body. The clamp member is engaged with the mounting collar with a snap-fit.

In accordance with another embodiment, a dispenser for cup-shaped articles comprises a body defining a storage region for receiving an associated stack of cup-shaped articles. The body comprises an open end that communicates with the storage region. A resilient diaphragm restricts the open end of the body. A clamp member is releasably secured adjacent the open end of the body and retains the diaphragm relative to the open end of the body. A mounting flange projects outwardly away from the body. The clamp member and mounting flange comprise mating structures that releasably secure said clamp member to the mounting flange.

In accordance with another embodiment, a dispenser for cup-shaped articles comprises a body that defines a storage region adapted for receiving for an associated stack of cup-shaped articles. A mounting collar is connected to the body and includes a flange projecting outwardly therefrom. A resilient diaphragm is located adjacent the open end of the storage region of the body. The diaphragm

restricts the open end for controlled dispensing of associated cup-shaped articles from within the storage region. A clamp-ring member secures the diaphragm adjacent the open end of the storage region of the body. The clamp-ring member and the flange of the mounting collar are secured to each other via engagement of at least one structure of the flange with a mating structure of the clamp-ring member.

Brief Description of the Drawings

The invention takes form in various components and arrangements of components, and in various steps and arrangements of steps, preferred embodiments of which are described herein and illustrated in the accompanying drawings that form a part hereof and wherein:

FIGURE 1 (prior art) illustrates a prior art cup dispenser as installed in a mounting structure, with portions of the dispenser and mounting structure broken away;

FIGURE 2 (prior art) is an exploded perspective view of the prior art cup dispenser shown in FIGURE 1 and showing alternative diaphragms;

FIGURE 3 is a side elevational view of a mounting collar for a dispenser formed in accordance with a first embodiment of the present development;

FIGURE 4 is a bottom plan view of the mounting collar shown in FIGURE 3;

FIGURE 5 is a top plan view of the mounting collar shown in FIGURE 3;

FIGURE 6 is a sectional view taken along line 6 - 6 of FIGURE 5;

FIGURE 7 is a bottom plan view of a clamp-member/clamp-ring formed in accordance with a first embodiment of the present development;

FIGURE 8 is a sectional view taken along line 8 - 8 of FIGURE 7;

FIGURE 9 is a partial sectional view of a dispenser for cup-shaped articles formed in accordance with the present development;

FIGURE 10 is a sectional view of an alternative mounting collar formed in

accordance with the present development;

FIGURE 11 illustrates another alternative mounting collar formed in accordance with the present development;

FIGURE 12 is a partial sectional view that shows use of the mounting collar of FIG. 11 with the clamp ring of FIGS. 7 and 8;

FIGURE 13 is similar to FIG. 12 but shows the mounting collar of FIG. 11 as used with an alternative clamp ring;

FIGURE 14 shows a dispenser for cup-shaped articles, partially in section, comprising the mounting collar of FIG. 11 and the clamp ring of FIG. 12.

Detailed Description

A dispenser for cups and other cup-shaped articles formed in accordance with the present development is illustrated in FIGURE 9 and described with reference to all of FIGURES 3-10. Referring first to FIGURE 9, except as otherwise shown and/or described, the dispenser assembly **100A** shown in FIGURE 9 is identical to the dispenser **A** described above with reference to FIGURES 1 and 2 (portions of the dispenser **100A** have not been shown to simplify the drawing). As such, reference number and letters used in FIGURE 9 to identify corresponding components of the dispenser **100A** relative to the dispenser **A** are "100" greater than those used in FIGURES 1 and 2, and portions of the dispenser **100A** that are identical to the dispenser **A** are not described further here.

In the illustrated embodiment, the dispenser **100A** differs from the dispenser **A** primarily in that the outermost edge **170** of the cup storage body **110** is formed differently, as is the mounting collar **150**. In particular, when the mounting collar **150** (shown separately in FIGURES 3 - 6) is fitted over the outermost edge **170** of the cup storage body **110**, the outermost edge **170** of the body **110** does not project outwardly above the flange **154** of the mounting collar **150**. Instead, the mounting collar **150** includes or defined an integral tubular projection **151** that includes an

outermost edge **153** having a radially enlarged lip or bite-tooth **155** extending at least partially therearound. When the mounting collar **150** is fitted to the upper end **120** of the cup storage tube or body **110**, outermost edge **170** of the body **110** is closely received within the base portion **152** of the mounting collar **150**, and the tubular projection **151** of the mounting collar **150** projects outwardly away from the edge **170** of the body **110** so as to provide a good mounting location for a resilient diaphragm **180** adjacent the open end **120** of the body **110** for restricting the open end **120**. The enlarged lip **155** of the edge **153** grips the diaphragm **180**. The diaphragm **180** is located adjacent and restricts the open end **120** of body **110** even though, in this embodiment, it is not directly connected to the body **110** (but it is connected directly to the body in other embodiments as described below).

With continuing reference to FIGURE 9 and FIGURES 3 - 6, the mounting collar **150** further comprises at least one and preferably at least first and second tabs **157a,157b** that project outwardly from the circular flange **154** at diametrically opposed locations. The tabs **157a,157b** are spaced radially outward from the tubular projection **151** on which the diaphragm **180** is mounted. The tabs **157a,157b** are preferably molded as a one-piece construction with the collar **150**, including the base portion **152**, flange **154** and tubular projection **151** from a suitable polymeric material. As such, the tabs **157a,157b** are adapted for limited resilient inward deflection toward and away from each other. The tabs **157a,157b** preferably include enlarged outer ends **159a,159b**, respectively.

With reference now to FIGURES 7 - 9 , the clamp-member or clamp-ring **184** is identical to the clamp-ring **84** described above, except that it includes first and second notches or indentations **189a,189b** defined in an outer cylindrical wall **188** thereof (the wall **188** can be otherwise shaped). The notches **189a,189b** are dimensioned and arranged for respective receipt of the enlarged outer ends **159a,159b** of the tabs **157a,157b** when the clamp-ring **184** is fully operatively connected to the mounting collar **150** to retain the diaphragm **180** in its operative

position as shown in FIGURE 9. More particularly, after a circular peripheral portion of the diaphragm member **180** is fitted to the outermost edge **153** of the tubular projection **151**, the circular opening **186** of the clamp-ring **184** is frictionally engaged around the peripheral portion of the diaphragm **180** as shown in FIGURE 9 so that the diaphragm **180** is pinched and/or gripped between the portion of the clamp-ring **184** that defines the opening **186** and the tubular projection **151** of the mounting collar **150**. At the same time, the enlarged ends **159a,159b** of the tabs **157a,157b** are received with a resilient snap-fit into the notches **189a,189b** of the clamp-ring **184**. Owing to the resilient nature of the tabs **157a,157b**, the enlarged ends **159a,159b** thereof of resiliently biased into engagement with the notches **189a,189b** so as to retain the clamp-ring **184** in its operative position, i.e., in griping engagement with the diaphragm **180**. The clamp-ring **184** can be detached by application of sufficient pulling force thereon to overcome the snap-fit established by receipt of the tabs **157a,157b** in the respective notches **189a,189b**, but engagement of the tabs **157a,157b** with notches **189a,189b** of clamp-ring reduces the likelihood of accidental dislodgement of the clamp-ring **184**. As such, the clamp-ring **184** retains the diaphragm in its operative position, i.e., adjacent the open end **120** of body **110** to restrict same.

As shown in FIGURES 7 and 8, the clamp-ring **184** preferably includes external markings or indicia **181a,181b** corresponding in number and location to the notches **189a,189b** so that a user is able to align the notches **189a,189b** with the tabs **187a,187b** by visually aligning the tabs **157a,157b** and the indicia **181a,181b**, respectively. The external markings or indicia **181a,181b** can be molded or otherwise formed integrally with the clamp-ring **184** (as shown a plurality of gripping ribs are molded integrally into the clamp-ring **184** as the indicia **181a,181b**) or can be applied by paint, stickers, engraving, and/or other suitable and convenient means. Alternatively, at least one mark or indicia **181a,181b** is provided on clamp-ring **184** to provide a location index for at least one of the notches **189a,189b**.

With the foregoing in mind, those of ordinary skill in the art will recognize that the clamp-ring **184** and flange **154** of the mounting collar **150** define mating structures that engage each other so that the clamp-ring **184** is releasably secured to the flange **154** and less susceptible to accidental dislodgement relative to known dispensers.

FIGURE 10 illustrates a mounting collar **250** formed in accordance with the present invention and usable with the clamp-ring **184** in the same manner as the mounting collar **150**. The mounting collar **250** is identical to the collar **50** described in relation to FIGURES 1 and 2 except that it includes tabs **257a,257b** that project outwardly from the flange **254** and correspond respectively to the tabs **157a,157b**. The mounting collar **250** does not, however, include any tubular projection for mounting a diaphragm **180**. Instead, as shown schematically in phantom lines, the mounting collar **250** is intended for use with metal or molded polymeric storage body **210** (e.g., body 10 as shown in FIGURES 1 and 2) that includes an open end **220** including an outermost edge **270** that extends through the mounting collar **250** and on which the diaphragm **180** is mounted.

FIGURES 11 - 13 illustrate another alternative mounting collar **250'** that is similar to the mounting collar **250**, i.e., the collar **250'** is intended for use with a storage body **10** (FIGS. 1 and 2) or a metal storage body that includes an open end **20** with an outermost edge **70** that extends through the collar **250'** (as shown schematically at 10 in broken lines in FIG.12). As shown in FIG. 14, a diaphragm **180** (FIG. 14) is mounted on the edge **70** and retained by the clamp-ring **184'** to form a dispenser **200A** for dispensing a stack **S** of cups **C** or other cup-shaped articles. Unlike the collar **250** that includes integral tabs **257a,257b** (as shown in FIG. 10) to engage a clamp-ring **184**, the mounting collar **250'** includes a plurality of circumferentially-spaced studs or buttons **300a,300b,300c** projecting outwardly from the flange **254'** thereof. In the illustrated embodiment, three studs **300a-300c** are provided and are fastened to the flange **254'** via fasteners **302**. These studs **300a-**

300c are defined from rigid or resilient material such as a suitable plastic material and each includes or defines an enlarged or bulbous outer end **304**. The mating clamp-ring **184'** (see FIGS. 12 and 14) is identical to the clamp-ring **184** except that it includes notches or undercuts **189'** dimensioned and positioned to receive the respective enlarged ends **304** of the studs **300a-300c** when the clamp-ring **184'** is operatively connected to the mounting collar **250'** as shown in FIGS. 12 and 14. In FIG. 12, the undercuts **189'** are shown as being defined in the outer wall **188'** as described above in relation to the clamp-ring **184**. Alternatively, the undercuts **189'** are defined in an inner wall **187'** that defines the opening **186'**. In either case, suitable markings or indicia **181'** such as labels, ribs, colored markings and/or the like are provided to assist a user in aligning the undercuts **189'** with the buttons **300a-300c** when installing the clamp-ring **184'**.

In one embodiment, the collar **250'** mounts to the cup storage body in the exact same manner as the collars **50,150,250** and, thus, includes the noted recesses or apertures (two are shown in FIG. 14 at **256a',256c'**) for receiving and retaining the bosses **40a-40d** of the body 10. Alternatively, the collar **250'** is secured to a cup storage body via screws, rivets, or other fasteners, e.g., when the body is defined from stainless steel.

The development has been described with reference to preferred embodiments. It is not intended that the scope of the claims be limited to the preferred embodiments. Instead, it is intended that the claims be construed literally and/or according to the doctrine of equivalents as broadly as legally possible.